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08/19/2010 /Pamela Gerik/
Date Pamela Gerik

DECLARATION OF JAMES W. RAWLINS, PH.D. UNDER 37 C.F.R. § 1.132

I, James W. Rawlins, do hereby declare and state that:

My Education and Experience related to Coatings Research and Coating Applications

1. I received a B.S. in Polymer Science in 1993 and Ph.D. in Polymer Science and Engineering in 1999, both from The University of Southern Mississippi.

2. I worked in polymer development and applications at Highland International, Inc. from 1999-2000 and worked as a Senior Research Chemist/Technical Marketing Manager of Powder Coating Raw Materials at Bayer Corporation from 2000-2004.

3. I am currently an Associate Professor of Polymer Science and Engineering at the University of Southern Mississippi.

4. I have extensive experience in polymer science and engineering as related to coatings and other material sciences, such as: forensic analysis of polymers, coatings, adhesives, fibers, films;

polymer-coated surfaces; chemical and biological agent permeability with crosslinked systems, polymer design for thermosetting systems; structure property-relationships with crosslinked polymer systems; polymer interpenetrating networks; compatible and incompatible blending in crosslinked polymer systems; raw material development from natural and renewable resources; and intelligent and responsive polymers.

5. I have authored over 60 scientific articles and 21 patent and patent applications related to coatings and polymeric compositions. My curriculum vitae is attached hereto as Exhibit A.

The Rejection of Claims of U.S. Patent Application No. 10/655,345 Under 35 U.S.C. §§ 112, first paragraph and 102(b)

6. I have reviewed U.S. Patent Application No. 10/655,345 to C. Steven McDaniel ("Dr. McDaniel") titled, "Biological Active Coating Components, Coatings, and Coated Surfaces" (referred to herein as "the '345 application"). In addition, I have reviewed independent claims 1, 272, 319, 368, 393 and 394 of the '345 application as well as amendments proposed for such claims by Dr. McDaniel which are to be submitted in a response to the office action filed in conjunction with this declaration. In particular, I understand all such claims are directed to coatings of an architectural coating, an automotive coating, a can coating, a chemical agent resistant coating (CARC), a camouflage coating, a traffic marker coating, and an aircraft coating. In addition, claim 319 is directed to an elastomer, an adhesive, a sealant and a wax.

7. I am familiar with the United States Patent and Trademark Office Action dated 02/19/2010 (referred to herein as "the office action") rejecting claims 1, 15-27, 67, 69-75, 79-89, 94-100, 102, 110-119, 121-135, 180-182, 217, 219-242, 251-255, 272, 309, 319-321, 323, 324, 326, 343-356, 360-362, 365-373, 376-385 and 389-394 of the '345 application. In particular, I have reviewed:

- The Examiner's basis for the rejections of claims 1, 15-27, 67, 69-75, 79-89, 94-100, 102, 110-119, 121-135, 180-182, 217, 219-242, 251-255, 272, 309, 319-321, 323, 324, 326, 327, 343-356, 360-362, 365-373, 376-385 and 389-392 of the '345 application under 35

U.S.C. § 112, first paragraph for enablement and written description as set forth on pages 6-18 of the office action; and

- The Examiner's basis for the rejection of claims 1, 15-20, 67, 69-72, 74, 75, 79-89, 94-100, 102, 110-119, 121-135, 180-182, 217, 219-223, 234-238, 251-255, 272, 319, 320, 343, 344, 351-353, 354-356, 360-362, 365-373, 376-385 and 389-394 of the '345 application under 35 U.S.C. § 102(b) in view of U.S. Patent No. 5,998,200 to Celia Bonaventura *et al.* titled "Anti-Fouling Methods Using Enzyme Coatings" (referred to in the office action and herein as "Bonaventura *et al.*") as evidenced by the document entitled "Micronized Porous Silica Gel" supplied by W.R. Grace & Co. (referred to in the office action and herein as "W. R. Grace & Co.") as set forth on pages 18-22 of the office action.

8. I have reviewed Bonaventura *et al.* and W. R. Grace & Co. in their entirety.

Analysis of the 112, First Paragraph Rejections of Independent Claims 1, 272, 319, 368, 393 and 394 for Enablement and Written Description

9. I understand that the Examiner deems that the specification of the '345 application does not reasonably enable any person skilled in the art to make and use any type of paint, comprising any components, and comprising any active enzyme of E.C. 3.1.8. (page 7 of the office action). In particular, I understand the Examiner deems the specification as not supporting the broad scope of claims 1, 272, 319, 368, 393 and 394 because the Examiner does not believe the specification establishes the following points as noted on pages 9 and 10 of the office action:

(A) the structure of any enzyme of E.C. 3.1.8, or variants or analogs thereof, that are active within any paint, comprising any components;

(B) regions of any enzyme having the desired biological characteristics that may, or may not, be modified without affecting the activity within any paint;

(C) the general tolerance of any E.C. 3.1.8 enzyme, having activity within any paint, to the modification and extent of such tolerance;

(D) a rational and predictable scheme for identifying or making the genus of E.C. 3.1.8 enzymes having activity within any paint;

(E) the compositions of paints that allow enzymes of E.C. 3.1.8 to be active;

(F) the compositions of paints that inhibit the activity of E.C. 3.1.8 enzymes;

(G) components of any paint that may, or may not, be modified without affecting the activity of any E.C. 3.1.8 enzyme;

(H) a rational and predictable scheme for identifying components of paints having the desired property of allowing any E.C. 3.1.8 enzyme to be active;

(I) the identity of any paints wherein the comprised enzyme of E.C. 3.1.8 is stable for more than one month or more than one year; and

(J) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

10. I understand that the Examiner deems that claims 1, 272, 319, 368; 393 and 394 contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. (page 17 of the office action).

11. I have been informed by Dr. McDaniel, the patent attorney of record for the '345 application, of the following patent examination rules and guidelines:

- The enablement requirement refers to the requirement of 35 U.S.C. 112, first paragraph that the specification describe how to make and how to use the invention. The invention that one skilled in the art must be enabled to make and use is that defined by the claim(s) of the particular application or patent. (MPEP 2164);

- To comply with 35 U.S.C. 112, first paragraph, it is not necessary to "enable one of ordinary skill in the art to make and use a perfected, commercially viable embodiment absent a claim limitation to that effect." *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1338, 68 USPQ2d 1940, 1944 (Fed. Cir. 2003). Detailed procedures for making and

using the invention may not be necessary if the description of the invention itself is sufficient to permit those skilled in the art to make and use the invention. (MPEP 2164);

- The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. A patent need not teach, and preferably omits, what is well known in the art. (MPEP 2164.01);

- The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. *In re Certain Limited-Charge Cell Culture Microcarriers*, 221 USPQ 1165, 1174 (Int'l Trade Comm"n 1983), *aff'd. sub nom., Massachusetts Institute of Technology v. A.B. Fortia*, 774 F.2d 1104, 227 USPQ 428 (Fed. Cir. 1985) (MPEP 2164.01);

- To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. (MPEP 2163); and

- Possession of the invention that is claimed may be shown in a variety of ways including description of an actual reduction to practice, or by showing that the invention was "ready for patenting" such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention. See, e.g., *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 68, 119 S.Ct. 304, 312, 48 USPQ2d 1641, 1647 (1998); *Eli Lilly*, 119 F.3d at 1568, 43 USPQ2d at 1406; *Amgen, Inc. v. Chugai Pharmaceutical*, 927 F.2d 1200, 1206, 18 USPQ2d 1016, 1021 (Fed. Cir. 1991) (MPEP 2163.02).

12. As one skilled in the art of polymer chemistry as well as coatings and other material science formulations and applications, I believe the specification of the '345 application clearly and

sufficiently describes the manner of making and using coatings, elastomers, adhesives, sealants, and waxes including any active enzyme of E.C. 3.1.8. In particular, I believe the specification provides ample guidance and direction on combining various components used to form coatings, elastomers, adhesives, sealants, and waxes with an enzyme to produce coatings, elastomers, adhesives, sealants, and waxes having an enzyme. In addition, I believe the specification provides ample guidance and direction on mixing prepared coatings elastomers, adhesives, sealants and waxes with an enzyme to produce coatings, elastomers, adhesives, sealants, and waxes having an enzyme. I believe the specification clearly sets forth the enzyme formulated with such coatings, elastomers, adhesives, sealants, and waxes may be any active enzyme of E.C. 3.1.8. Moreover, I believe the specification clearly sets forth how to make coatings, elastomers, adhesives, sealants, and waxes comprising enzymes with any known components for imparting desired properties for coatings, elastomers, adhesives, sealants, and waxes, such as but not limited to binders, fillers, and preservatives, for example. I believe the specification clearly sets forth how to use coatings, elastomers, adhesives, sealants, and waxes comprising an enzyme, specifically by applying the coatings, elastomers, adhesives, sealants, and waxes to a surface.

13. Upon review of the '345 application, it is my understanding that the determination of an active enzyme of E.C. 3.1.8 may be derived by techniques which are not only known in the art of biotechnology, but which are routinely performed in the art of biotechnology. Based on this understanding as well as the patent examination guidelines noted above, it is my understanding that the determination and selection of an active enzyme of E.C. 3.1.8 does not require undue experimentation.

14. It is my further belief, that the '345 application clearly sets forth how to analyze and test the enzymatic activity of coatings, elastomers, adhesives, sealants, and waxes formulated with enzymes. Furthermore, it is well known in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes of how to analyze and test coatings, elastomers, adhesives, sealants, and waxes for suitable properties associated with different components of the coatings, elastomers, adhesives, sealants, and waxes. Moreover, it is well known in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes of how to test and

change formulations of components to meet suitable properties for coatings, elastomers, adhesives, sealants, and waxes. Based on such, I believe one skilled in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes would be apprised of how to analyze coatings, elastomers, adhesives, sealants, and waxes formulated with an E.C. 3.1.8 enzyme to determine which, if any, components of the coatings, elastomers, adhesives, sealants, and waxes may, or may not, be modified without affecting the activity of the enzyme. In addition, I believe one skilled in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes would, based on such analysis, be able to establish a rational and predictable scheme for identifying components of coatings, elastomers, adhesives, sealants, and waxes which allow and those which inhibit an E.C. 3.1.8 enzyme's activity. I believe one skilled in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes would be able to identify coating, elastomer, adhesive, sealant, and wax compositions, on the whole, which allow an E.C. 3.1.8 enzyme to be active, those which inhibit the activity of an E.C. 3.1.8 enzyme, and those in which the comprised enzyme of E.C. 3.1.8 is stable for more than one month or more than one year. Furthermore, I believe conducting such analyses, establishing such schemes, and identifying such coating, elastomer, adhesive, sealant, and wax compositions would not require undue experimentation since such actions are routinely performed in the art for components in such classes of materials.

15. The aforementioned statements are substantiated by the fact that I have made a wide variety of coating compositions (i.e., different types of coatings as well as coatings of varying components) having an E.C. 3.1.8 enzyme incorporated therein based on information disclosed in the '345 application. In particular, I did not need to look for guidance beyond what is disclosed in the '345 application for making, analyzing or using the coating compositions I made.

16. I believe the specification of the '345 application provides ample written description to make it clear that the inventor of the claimed subject matter had possession that scope of the invention encompassed any type of coating, elastomer, adhesive, sealant, and wax comprising any components and comprising any active enzyme of E.C. 3.1.8.

17. Based on my understanding on the aforementioned patent examination rules and guidelines and my review of the '345 application, it is my understanding that the specification provides ample enablement and written description for the subject matter recited in claims 1, 272, 319, 368, 393 and 394.

Analysis of the Anticipation Rejection of Independent Claims 1, 272, 319, 368, 393 and 394 in view of Bonaventura *et al.*

18. I understand Bonaventura *et al.* discloses coatings containing combinations of immobilized bioactive species for preventing fouling of an aquatic apparatus by an aquatic organism, wherein the bioactive species are enzymes, enzyme inhibitors, repellants, chelating agents, surfactants or non-metallic toxicants. In particular, Bonventura *et al.* discloses the coatings may be used to affix immobilized bioactive species to a surface intended for use in contact with an aquatic environment to prevent fouling of the surface by an aquatic organism. (Title, Abstract, and column 2, lines 44-56 of Bonaventura *et al.*) There is no teaching in Bonaventura *et al.* of incorporating the immobilized bioactive species described therein in elastomers, adhesives, sealants or waxes.

19. I understand Bonaventura *et al.* references the term 'aquatic environment' as including cooling towers, fresh and salt water piping systems, desalination and other filtration systems containing membrane "surfaces" subject to protection, and other aquatic environments which rely upon the intervention of human beings for their creation and maintenance. In addition, Bonaventura *et al.* teaches the term 'aquatic environment' includes those of natural environments, such as ponds, lakes, dredged channels and harbors, and other bodies of water which were initially produced by the action of human beings but which do not rely upon human intervention for the supply of water into and out of such environments. (Column 5, line 50 to column 6, line 13 of Bonaventura *et al.*)

20. I understand that the Examiner deems the list of coatings recited in independent claims 1, 272, 319, 368, 393 and 394 as not excluding paints for marine surfaces. In addition, I understand that Examiner surmises that there is an expectation that the paint taught in Bonaventura can be

used on surfaces other than marine surfaces. Furthermore, it is my understanding that Examiner interprets many of coatings recited in independent claims 1, 272, 319, 368, 393 and 394 to be applicable for marine surfaces. (Page 19 of the office action).

21. I have been informed by Dr. McDaniel, the patent attorney of record for the '345 application, of the following patent examination rules and guidelines:

- During examination, the claims must be interpreted as broadly as their terms reasonably allow. *In re American Academy of Science Tech Center*, 367 F.3d 1359, 1369, 70 USPQ2d 1827, 1834 (Fed. Cir. 2004). This means that the words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (MPEP 2111.01);

- The ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, *i.e.*, as of the effective filing date of the patent application. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 75 USPQ2d 1321, 1326 (Fed. Cir. 2005) (*en banc*) (MPEP 2111.01);

- While features of a claimed article may be recited either structurally or functionally, claims directed to an article must be distinguished from the prior art in terms of structure rather than function per M.P.E.P § 2114; and

- A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (MPEP 2131).

22. It is of the general knowledge to those of ordinary skill in the art of polymer chemistry that coatings are designed with the "end in mind". Very specifically, each is formulated to result in materials suitable for the particular environment in which they are intended to be used. As such, although the specific coatings recited in claims 1, 272, 319, 368, 393 and 394 are termed in

a manner of their intended application, the terms each convey their own compositional differences and the terms are not simply differentiated by their intended use alone or by the surfaces to which they will be applied as purported by the Examiner on page 19 of the office action. In contrary, the use denoted in the coating terms dictates the necessary performance which in turn becomes a critical requirement for method of application, specific coating composition and ultimate performance. Thus, different types of coatings, including each of the coatings recited in claims 1, 272, 319, 368, 393 and 394 as well as coatings developed for aquatic environments, are compositionally distinct from each other.

23. The claimed coating types are recognized by those of skill in the art as terms imparting the compositional and materials differences, structural characteristics and performance differences associated with each type of coating so that the coating material is a composition suitable for their intended end use applications. Those of ordinary skill in the art of coatings are aware and recognize that the end use application forces formulation differences and in turn requires materials, compositional, and performance characteristics associated with each type of coating. As such, one of ordinary skill in the art would be aware that the scope of the subject matter recited in claims 1, 272, 319, 368, 393 and 394 is directed to and is limited to coatings of the recited coating types.

24. It is my understanding that the evaluation of whether Bonaventura *et al.* anticipates claims 1, 272, 319, 368, 393 and 394 is not whether the coating compositions taught in Bonaventura *et al.* may be used for the intended use reflected in the coating terms recited in claims 1, 272, 319, 368, 393 and 394, but is whether the coating compositions taught Bonaventura *et al.* match the structural needs or limitations of the coating terms recited in claims 1, 272, 319, 368, 393 and 394. None of the coating types recited in claims 1, 272, 319, 368, 393 and 394 refer to coatings specifically formulated for contact with an aquatic environment, including the environments noted by Bonaventura *et al.* as being encompassed by the term 'aquatic environment' (i.e., natural bodies of water as well as cooling towers, fresh and salt water piping systems, desalination and other filtration systems containing membrane "surfaces" subject to protection, and other aquatic environments which rely upon the intervention of human beings

for their creation and maintenance). Thus, the coating types recited in claims 1, 272, 319, 368, 393 and 394 are distinct from the coatings taught in Bonaventura *et al.* Consequently, claims 1, 272, 319, 368, 393 and 394 exclude the coatings taught in Bonaventura *et al.*

25. Contrary to the statement made by the Examiner on page 19 of the office action, there is no expectation from the viewpoint of one skilled in the art of polymer chemistry that the coatings described in Bonaventura *et al.* would be used on surfaces other than those to be placed in contact with an aquatic environment. In particular, the objective of the coatings described in Bonaventura *et al.* is to prevent fouling of an aquatic apparatus when placed in an aquatic environment and, thus, one skilled in the art of polymer chemistry would not expect the coatings to be used on non-aquatic apparatuses. Further to that regard, it is my understanding that the bioactive species included in the coatings taught in Bonaventura *et al.* are configured to only reduce the fouling of aquatic organisms and, thus, would not serve to provide antifouling properties in a non-aquatic environment or for extended service. For at least such reasons, using the coatings described in Bonventura *et al.* on non-aquatic apparatuses and/or incorporating the bioactive species taught in Bonaventura *et al.* in any of the coatings recited in claims 1, 272, 319, 368, 393 and 394 would be futile and would be contrary to the accepted wisdom in the art of coatings. In particular, there would be no reasonable expectation of success that the coatings could reasonably provide the antifouling properties discussed in Bonaventura *et al.* and, thus, the invention disclosed in Bonaventura *et al.* would be rendered unsatisfactory for its intended purpose.

26. Since the recitation of the specific coatings in claims 1, 272, 368, 393 and 394 impart structural differences from the aquatic coatings taught in Bonaventura *et al.* and, thus, not all elements of claims 1, 272, 368, 393 and 394 are expressly, implicitly or inherently described in Bonaventura *et al.*, it is my understanding that Bonaventura *et al.* does not anticipate the limitations of claims 1, 272, 368, 393 and 394.

27. It is of the general knowledge to those of ordinary skill in the art of polymer chemistry as well as coatings and other material science formulations and applications that elastomers,

adhesives, sealants, and waxes are structurally distinct compositions from coatings. In particular, an elastomer by definition is a material that can be elongated greater than 200% and recover its original shape over time without detriment to performance. Many elastomeric materials do not achieve a critical criteria for paints and coatings, e.g., adhesion. In addition, an adhesive by definition refers to a composition capable of attachment to one or more surfaces ("substrates") of one or more objects ("adherents"), wherein the composition comprises a solid or is capable of converting into the solid, wherein the solid is capable of holding a plurality of objects ("adherents") together by attachment to the surface of the objects while withstanding a normal operating stress load placed upon the objects and the solid. Similarly, a sealant refers to an adhesive composition capable of attachment to a plurality of surfaces to fill a space and/or a gap between the plurality of surfaces and form a barrier to a gas, a liquid, a solid particle, an insect, or a combination thereof. In contrast, a coating is an abhesive material, which by definition is a material applied to a surface to inhibit adhesion/sticking of an additional material to the abhesive and/or a surface the abhesive covers. A wax refers to natural and synthetic compounds with sufficient linear molecular weight and composition to produce solid but low melting temperature compounds that are also low viscosity in the melt state and may be analogous to many polymers but are sufficiently low in molecular weight, so as; waxes do not provide mechanical properties like tenacity as similar but higher molecular weight polymeric analogs/homologs. Most commonly, waxes are used to modify surface lubricity and gloss by blending at additive levels with coatings but being incompatible and therefore selectively phase separating to the air interface and acting as described above in an automatic surface tension driven mechanism.

28. Since the recitation of the specific coatings in claim 319 impart structural differences from the coatings taught in Bonaventura *et al.* and Bonaventura *et al.* fails to teach incorporating the immobilized bioactive species described therein in elastomers, adhesives, sealants or waxes, it is my understanding that Bonaventura *et al.* fails to anticipate the limitations of claim 319.

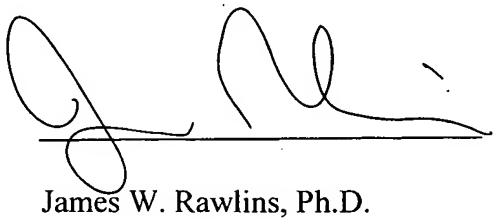
29. Another critical point to maintain regarding Bonaventura *et al.*, I note that the teachings therein heavily emphasize immobilizing the bioactive species in or on a polyurethane matrix and then subsequently adding the combined polyurethane and bioactive species into a coating, such

as a paint, to ensure the enzymes can maintain their activity in the combined matrix/coating material (*see*, e.g., column 13, lines 20-48, Examples I-V, and independent claims 1 and 14). In fact, Bonaventura *et al.* specifically teaches that immobilization via a polyurethane matrix is needed in order for an enzyme to maintain functional activity within a paint, "It was desirable to document that an enzyme could maintain functional activity when mixed with a traditional paint such as a latex-based paint or an enamel (if premixed with a polyurethane polymer) ..." (Bonaventura et al., column 34, lines 43-46, underline added for emphasis). Based on such strongly emphasized teachings, I, as one skilled in the art, would not be inclined to incorporate enzymes within coatings without use of a polyurethane matrix. In particular, as one skilled in the art, I would not expect that enzymes would be able to retain their enzymatic functionality when added to a coating without a manner of immbolizing and protecting the enzymes therein by incorporation into the matrix taught by Bonaventura. Considering this context, the teachings of the '345 application are not similar to the teachings of Bonaventura, as the '345 application describes direct blending of an enzyme with a defined set of materials directly for use as functional films. This is a critical departure and an unobvious result that surprises those skilled in the art from both the biochemistry and surface coatings perspectives.

Analysis of W. R. Grace & Co. as Evidence to the teachings of Bonaventura *et al.*

30. I understand W. R. Grace & Co. provides a description of microporous silica gel, including micronized porous silica hydrogels which are described as being unique for their low dusting tendency and allowance for rapid incorporation into aqueous formulations. I further acknowledge the Examiner's statement on page 18 of the office action regarding W. R. Grace & Co., "The paints of Bonaventura et al comprise polyurethane hydrogel, which has a thermoplastic binder, silica microspheres, and an antifoamer (Grace, Inc)." It is not clear to me how the teachings of W. R. Grace & Co. relate to the teachings of Bonaventura or what the Examiner is stating is evidenced by W. R. Grace & Co. Nonetheless, I do not find the teachings of W. R. Grace & Co. obviate the aforementioned statements that Bonaventura *et al.* does not anticipate the limitations of claims 1, 272, 319, 368, 393 and 394.

31. I declare that all statements made herein of my own knowledge are true and that all statements made herein of my own belief are believed to be true. I further declare that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application and any patent issued thereon.



8.19.2010

Date

James W. Rawlins, Ph.D.

EXHIBIT A

CURRICULUM VITAE

JAMES W. RAWLINS, PH.D.

CONTACT INFORMATION

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TECHNICAL AND RESEARCH INTERESTS

Polymer Science and Engineering; Polymer Design for Thermosetting Systems; Polymer-Coated Surfaces; Compatible and Incompatible Blending in Crosslinked Polymer Systems; Forensic Analysis of Polymers, Coatings, Adhesives, Fibers, and Films; Structure-Property Relationships with Crosslinked Polymer Systems for Molecular Healing; Biobased Raw Material Derivatives and Utilization; Chemical and Biological Agent Permeability with Crosslinked Systems; Nanoencapsulation for Embedded Raw Material Delivery; Emulsion and Miniemulsion Polymerization; Polymeric Photovoltaic Materials; and Polymer Synthesis and Healing via Enzymatic Catalysis.

PERSONAL DATA

Birth Date: January 28, 1969, Fayetteville, North Carolina, USA.
Married: Monica N. Rawlins. Children: Wesley D. Rawlins and Alexandria L. Rawlins.
Clearance: SECRET.
Languages: English; German.

EDUCATION

1999 Ph.D., Polymer Science and Engineering, Dissertation "Design, Synthesis, Characterization, and Utilization of Functionalized Solid Polymers as Ultraviolet Curable Powder Coatings," The University of Southern Mississippi, Hattiesburg, MS.

- Academic Graduate Research – Synthesis and development of thermal and UV curable solid polymers and application as protective and decorative coatings.
- Industrial Graduate Research – Design and execution of 11 powder coating projects.

1993 B.Sc., Polymer Science, The University of Southern Mississippi, Hattiesburg, MS. Undergraduate research – Evaluation of metal driers in oil-modified polyesters, kinetics, heat evolution, and curing behavior.

PROFESSIONAL EXPERIENCE

- Jun 2004 to present, Assistant Professor, The University of Southern Mississippi, School of Polymers and High Performance Materials, Hattiesburg, MS. Directs the Thames-Rawlins Research Group of approximately 40 researchers and office personnel.
- May 2002 to May 2004, Technical Marketing Manager, Bayer MaterialScience, Coatings Business Development, Leverkusen, Germany. Resolved technical issues for powder coating raw materials sold in Europe, Middle East, and Africa.
- May 2000 to May 2002, Senior Research Chemist, Bayer Corporation, Coatings and Colorants Division, Coatings Research Group, Pittsburgh, PA. Focused on crosslinker, prepolymer, and specialty polymer development for thermally curable OEM coatings.
- Jul 1999 to May 2000, Technical Director, Highland International, Inc., Boone, NC. New product development for a protective coatings manufacturer, assisted with QC, production, logistics, and technical sales support.
- Aug 1995 to Jun 1999, Graduate Research Assistant, The University of Southern Mississippi, Hattiesburg, MS. Organized and implemented industrial and academic research projects. Directed five undergraduate research associates.

PROFESSIONAL AFFILIATIONS

- Polymeric Materials Science and Engineering Division of the American Chemical Society
- Polymer Chemistry Division of the American Chemical Society
- Materials Research Society
- Powder Coatings Institute
- Society for Protective Coatings
- Southern Society for Coatings Technology
- Federation of Societies for Coatings Technology
- American Oil Chemists' Society
- Association for the Advancement of Industrial Crops
- Hattiesburg Area Development Partnership (ADP)
- American Association for the Advancement of Science
- American Chemical Society
- Mississippi Academy of Sciences
- Society for the Advancement of Material and Process Engineering

RESEARCH GROUP AWARDS AND ACHIEVEMENTS

- 2009 Third Place Poster Presentation for Brandon C. Achord, Southern BioProducts and Renewable Energy Conference, Jackson, MS, May 20-21, 2009.
- 2008 American Coatings Show Best Paper Award for James W. Rawlins *et al.*, co-sponsored by NPCA and Vincentz Network, Charlotte, NC, June 9, 2008.
- 2008 Research Presentation Award for Yvette Abadie, Twenty-Seventh Annual Undergraduate Research Conference, sponsored by The University of Memphis, Memphis, TN, Feb. 23, 2008.
- 2008 Third Place Student Division Business Plan Competition for James Whittemore, sponsored by Mississippi Technology Alliance, Jackson, MS, May 13, 2008.

- 2007 Elias Singer Outstanding Student Paper Award for Micah Black, sponsored by Troy Chemical Company at The Waterborne Symposium-Advances in Intelligent Coatings Design New Orleans, LA, Feb. 14-16, 2007.
- 2006 Rawlins Elected Member-at-Large for the Polymeric Materials Science and Engineering Division Executive Committee, American Chemical Society, Fall 2006.
- 2006 Herman and Myrtle Student Paper Competition Award for E. N. Johnson sponsored by American Association of Textile Chemists and Colorists: International Conference and Exhibition, Atlanta, GA, Nov. 2006.
- 2006 Elias Singer Outstanding Student Paper Award for Micah Black, sponsored by Troy Chemical Company at the Thirty-Third International Waterborne, High-Solids, and Powder Coatings Symposium, New Orleans, LA, Feb. 23-25, 2006.
- 2006 Frank C. Naughton Award for Micah Black, American Oil Chemists' Society, St. Louis, MO, Apr. 30-May 3, 2006. The Frank C. Naughton Award recognizes the outstanding merit and performance of a student's research.
- 2006 AOCS Honored Student Award for Micah Black, sponsored by American Oil Chemists' Society, St. Louis, MO.
- 2005 Zeon Chemical Graduate Student Service Award for Micah Black, Zeon Chemical Company, Hattiesburg, MS.
- 2005 Elias Singer Outstanding Student Paper Award for Carolina Quintero, sponsored by Troy Chemical Company at the Thirty-Second International Waterborne, High-Solids, and Powder Coatings Symposium, New Orleans, LA, Feb. 2-4, 2005.
- 2005 Industrial Oil Products Division Student Award for Carolina Quintero, sponsored by the American Oil Chemists' Society, Salt Lake City, UT.
- 2005 Best Academic Polymer Poster, Carolina Quintero, Polyurea Development Association Annual Conference, Gulfport MS.
- 2000 First Place Poster Award for Gregory Booth, James W. Rawlins, and Shelby Thames, "Real Time Kinetic Study of Curing in UV-Curable Powder Coatings," ICE Expo, Federation of Societies for Coatings Technology, Chicago, IL.
- 1998 Third Place Poster Award for James W. Rawlins, Ramesh Subramanian, and V. S. Nithianandam, "New Impact Modifier for UV Cured Powder Coatings," ICE Expo, Federation of Societies for Coatings Technology, New Orleans, LA.
- 1997 Zeon Chemical Graduate Student Service Award for James W. Rawlins, Zeon Chemical Company, Hattiesburg, MS.
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2. Cure kinetics of Epoxy Resin via Near IR, Monoj Pramanik, Eric Fowler, Sharathkumar K. Mendon, and James W. Rawlins, Poster Presentation, Polymer Composite Matrix Science Workshop, *Proceedings of the Thirty-Seventh International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, February 8-9, 2010.
3. The Effect of Network Formation on Fracture Toughness of Epoxy-Amine Thermosets, Jonathan A. Scott, Kevin Davis, Monoj Pramanik, and James W. Rawlins, Poster Presentation, Polymer Composite Matrix Science Workshop, *Proceedings of the Thirty-Seventh International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, February 8-9, 2010.
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4. Vegetable Oil Macromonomer Latexes, Charles White and James Rawlins, Presentation, Mississippi Academy of Science, Olive Branch, MS, and The University of Memphis, Memphis, TN, February 2008.
5. Synthesis of Novel Vegetable Oil-Based Associative Thickeners, Monoj Pramanik, Sharathkumar K. Mendon, James W. Rawlins, and Shelby F. Thames, Presentation, *Thirty-Fifth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, January 2008.

6. Structure-Property Relationships of Self-Crosslinking Vegetable Oil Macromonomer-Based Latex Copolymers, Guangjie Hao, Sharathkumar K. Mendon, David E. Delatte, James W. Rawlins, and Shelby F. Thames, Presentation, *Thirty-Fifth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, January 2008.
7. Characterization of Isocyanate Nanocapsules, Huaxiang Yang, Sharathkumar K. Mendon, and James W. Rawlins, Presentation, *Thirty-Fifth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, February 2008.
8. Enzyme Catalyzed Small Molecule Reactions in Polymer Films, Pirro Cipi and James W. Rawlins, Poster Presentation, *Thirty-Fifth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, January 2008.
9. Vegetable Oil-Based Macromonomers and Waterborne Industrial Coatings, Yvette Abadie and James W. Rawlins, Poster Presentation, *Thirty-Fifth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, January 2008.
10. Modified Fox Equation to Predict Glass Transition Temperatures of Vegetable Oil Macromonomer Latexes, Charles White and James W. Rawlins, Poster Presentation, *Thirty-Fifth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, January 2008.
11. Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Materials Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation, Stabilization, and Lifetime of Polymers, Modern Coatings – Current & Emerging Technologies Short Course, James W. Rawlins, New Orleans, LA, 2008.

2007

1. Emulsion Polymerization of Vegetable Oil Macromonomers, Micah Black and James W. Rawlins, Presentation, 71st SSCT Meeting and Technology Showcase, Daytona Beach, FL, May 2007.
2. Formaldehyde-Free Soybean Protein-Based Particleboard, James W. Rawlins, Presentation, U.S. Soybean Board, Soy Protein Technical Advisory Panel, St. Louis, MO, February 2007.
3. Introduction to Polymer Science; Polymer Synthesis and Design; Silicones and Fluoropolymers; Waterborne Technology Review; Biorefinery Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Emerging Trends; Service Life Prediction of Coatings; Polyurethanes; and Functional Films, Coatings Science for Coatings Chemists Short Course, James W. Rawlins, Hattiesburg, MS, 2007.
4. Auto-Oxidation Study of Model Fatty Acid-Functionalized (Meth)Acrylic Copolymers, Micah S. Black, James H. Whittemore IV, and James W. Rawlins, Presentation, *Thirty-Fourth International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, February 2007.
5. Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Materials Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation, Stabilization, and Lifetime of Polymers, Modern Coatings – Current & Emerging Technologies Short Course, James W. Rawlins, New Orleans, LA, 2007.

2006

1. Introduction to Paints and Coatings, James W. Rawlins, FBI Short Course for Forensic Analysis of Paint, Quantico, VA, December 2006.
2. Durable Press Performance of Vegetable Oil Derivatives, Ericka N. Johnson, Sharathkumar K. Mendon, James W. Rawlins, and Shelby F. Thames, Presentation, Herman and Myrtle Student Paper Competition, American Association of Textile Chemists and Colorists: International Conference and Exhibition, Atlanta, GA, November 2006.
3. Nature's Best: Greener and Eco-Friendly Raw Materials, James W. Rawlins, Federation of Societies for Coatings Technology, ICE 2006 Preshow Short Course, New Orleans, LA, October 2006.
4. Spectroscopic Elucidation of Textile Performance with Biobased Crosslinkers, E. N. Johnson, James W. Rawlins, S. K. Mendon, S. F. Thames, Presentation, The Alliance for Graduate Education in Mississippi and the University of Puerto Rico Research and Cultural Exchange, San Juan, Puerto Rico, October 2006.
5. Vegetable Oil Derivatives as Monomers for Emulsion Polymerization, James W. Rawlins, Presentation, AAIC 2006 Conference, San Diego, CA, October 2006.
6. Thiol-Ene UV Curable Coatings Using Vegetable Oil Macromonomers, Micah Black, James W. Rawlins, and Shelby F. Thames, Presentation, 97th AOCS Annual Meeting and Expo, St. Louis, MO, May 2006.
7. Formulation and Aging of Soy Protein-Based Adhesive Characterized by ATR-IR Spectroscopy, Jeanne N. Shera, James W. Rawlins, and Shelby F. Thames, Presentation, 97th AOCS Annual Meeting and Expo, St. Louis, MO, May 2006.
8. Degradative Chain Transfer in VOMM-Based Emulsion Copolymerization, Carolina Quintero, Stacy Stromeyer, James W. Rawlins, and Shelby F. Thames, Presentation, *Thirty-Third International Waterborne, High-Solids, and Powder Coatings Symposium*, New Orleans, LA, February 2006.
9. Chain Transfer of Vegetable Oil Macromonomers in Solution Polymerization, Micah Black, Lance Baird, and James W. Rawlins, Presentation, *Thirty-Third International Waterborne, High-Solids, and Powder Coatings Symposium,* New Orleans, LA, February 2006.
10. Network Development and Degradation During Cure and Utilization: 2K Epoxy Model System, James W. Rawlins and Kevin Davis, Presentation, *Thirty-Third International Waterborne, High-Solids, and Powder Coatings Symposium,* New Orleans, LA, February 2006.
11. Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Materials Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation and Stabilization of Polymers, Modern Coatings – Current & Emerging Technologies Short Course, James W. Rawlins, New Orleans, LA, 2006.

2005

1. Synergistic Degradation, Let the Healing Begin, James W. Rawlins, St. Louis Society for Coatings Technology, St. Louis, MO, June 2005.
2. Paint, Fibers, and Films, James W. Rawlins, FBI Short Course on Paint and Coatings, Quantico, VA, June 2005.

3. Adapting and Using Vegetable Oils - The Next Generation of Coatings Technologies, James W. Rawlins, Sharathkumar Mendon, and Shelby F. Thames, Presentation, 96th AOCS Annual Meeting & Expo, Salt Lake City, UT, May 2005.
4. Secondary Structural Changes During Adhesive Processing of Soy Protein Isolate via ATR-IR, Jeanne N. Shera, James W. Rawlins, and S. F. Thames, Wood Adhesives 2005, San Diego, CA, November 2005.
5. Soy Protein Secondary Structural Changes During Processing and Storage via ATR-IR Spectroscopy, with Jeanne N. Shera, James W. Rawlins, and Shelby F. Thames, Eastman Focus School Forum, Kingsport, TN, June 2005.
6. Novel Vegetable Oil Macromonomers for Use in Thiol-Ene Curable Coatings: Auto-oxidation Study, M. S. Black, James W. Rawlins, and S. F. Thames, Poster Presentation, 2005 International RADTECH Conference, Shanghai, China, May 2005.
7. Vegetable Oil Macromonomer-Based Textile Latex for Durable Press Finishing, E. N. Johnson, James W. Rawlins, S. K. Mendon, and S. F. Thames, Tongji University, Material Science and Engineering Department, Shanghai, China, and Tsinghua University, Department of Chemical Engineering, Beijing, China, May 2005.
8. Reaction Calorimetry as a Tool to Determine Diffusion of Vegetable Oil Macromonomers in Emulsion Polymerization, Carolina Quintero, David Delatte, Keri Diamond, S. K. Mendon, James W. Rawlins, S. F. Thames, Presentation, 96th AOCS Annual Meeting, Salt Lake City, UT, May 2005.
9. Novel Vegetable Oil Macromonomers for Use in Thiol-Ene Curable Coatings: Synthesis, Characterization, and Coating Formulation, M. S. Black, James W. Rawlins, and S. F. Thames, Poster Presentation, 2005 Polyurea Development Association Annual Conference, Biloxi, MS, April 2005.
10. Modifying Vegetable Oil Macromonomers for Optimal Incorporation in Waterborne Systems, Carolina Quintero, David Delatte, S. K. Mendon, James W. Rawlins, and S. F. Thames, Poster Presentation, 2005 Polyurea Development Association Annual Conference, Biloxi, MS, April 2005.
11. Secondary Structural Changes During Adhesive Processing of Soy Protein Isolate via ATR-IR, J. N. Shera, James W. Rawlins, and Shelby F. Thames, Presentation, 2005 Bio-Products Conference, Jackson, MS, March 2005.
12. Wood Composites: Evaluation of Shelf Stability, Crosslinker Model Study, and Soil Degradation Properties, J. N. Shera, B. Sankovich, J. T. Faulkner, R. B. Thompson, J. M. Evans, J. Rawlins, and S. F. Thames, Poster Presentation, 2005 Bio-Products Conference, Jackson, MS, March 2005.
13. Modifying Vegetable Oil Macromonomers for Optimal Incorporation in Waterborne Systems, Carolina Quintero, David Delatte, Keri Diamond, Sharathkumar K. Mendon, James W. Rawlins, and Shelby F. Thames, Presentation, *Thirty-Second International Waterborne, High-Solids, and Powder Coatings Symposium,* New Orleans, LA, February 2005.
14. Property Development in Latexes Using Soybean Oil Acrylated Macromonomer, Sandipan Dutta, Catherine Blackwell, Nick Gariano, James W. Rawlins, and Shelby F. Thames, Presentation, *Thirty-Second International Waterborne, High-Solids, and Powder Coatings Symposium,* New Orleans, LA, February 2005.

15. Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Materials Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation and Stabilization of Polymers, Mocern Coatings – Current & Emerging Technologies Short Course, James W. Rawlins, New Orleans, LA, 2005.

2004

1. Polymers in Coatings; and Photodegradation of Polymers, Modern Coatings Technology Short Course, James W. Rawlins, New Orleans, LA, 2004.
2. Introduction to Polymers and Automotive Coatings Basics, FBI Chemistry Unit Short Course for Paints, Fiber, and Films, James W. Rawlins, Quantico, VA, November 2004.

2003

1. The Tie that Binds Polymers in Coatings; and Photodegradation and Stabilization of Polymers, Modern Coatings Technology Short Course, James W. Rawlins, New Orleans, LA, 2003.

2002

1. The Industrial Status of Powder Coating Plastics, Coating Plastics Symposium, DFO Tagung Kunstofflackierung, James W. Rawlins, Dresden, Germany, November 2002.
2. A New Generation of Low- or Non- Emissive Crosslinkers for Polyurethane Powder Coatings, Sharon Feng, James Rawlins, Reinhard Halpaap, and Hans Laas, ICE Expo 2002, New Orleans, LA, October 2002.
3. Polymer Science for Powder Coatings; Polymer Design and Chemistry for Powder Coatings; Powder Coating Formulation; Instrumental Analysis and Predictive Models for Powder Coatings; and Surface Pretreatment for Powder Coatings, Powder Coatings Science and Technology Short Course, James W. Rawlins, Hattiesburg, MS, 2002.
4. Photodegradation and Stabilization of Polymers, Modern Coatings Technology Short Course, James W. Rawlins, New Orleans, LA, 2002.
5. Introduction to Powder Coatings, Bayer Polymer Science Luncheon Series, James W. Rawlins, Pittsburgh PA, February 2002.

2001

1. Polymer Design and Chemistry for Powder Coatings; Powder Coating Formulation; Crosslinkers for Powder Coatings; and Instrumental Analysis and Predictive Models for Powder Coatings, Powder Coatings Science and Technology Short Course, James W. Rawlins, Hattiesburg, MS, 2001.
2. Photodegradation and Stabilization of Polymers, Modern Coatings Technology Short Course, James W. Rawlins, New Orleans, LA, 2001.

2000

1. Polymer Design for Powder Coatings; Powder Coatings Additives; Powder Coating Formulation; Powder Coatings Surface Pretreatment; and Instrumental Analysis of Powder Coatings, Introduction to Powder Coatings Short Course, James W. Rawlins, Hattiesburg, MS, 2000.

2. Introduction to Polymer Science, FBI Forensic Analysis of Paint and Polymers Short Course, James W. Rawlins, Quantico, VA, 2000.
3. Photodegradation and Stabilization of Polymers; and The Science of Powder Coatings, Modern Coatings Short Course, James W. Rawlins, New Orleans, LA, 2000.

1999

1. Introduction to Polymer Science, FBI Forensic Analysis of Paint and Polymers Short Course, James W. Rawlins, Quantico, VA, 1999.
2. Polymer Design for Powder Coatings; Powder Coatings Additives; Powder Coating Formulation; Powder Coatings Surface Pretreatment; and Instrumental Analysis of Powder Coatings, Introduction to Powder Coatings Short Course, James W. Rawlins, Hattiesburg, MS, 1999.
3. Principles of Polymer Science; Surface Pretreatment Techniques; and The Science of Powder Coatings, Introduction to Coatings Science Short Course, James W. Rawlins, Hattiesburg, MS, 1999.
4. Photodegradation and Stabilization of Polymers; and The Science of Powder Coatings, Modern Coatings Short Course, James W. Rawlins, New Orleans, LA, 1999.

1998

1. An Inside View of Polymers, Characteristics, Processing, and Behavior, James W. Rawlins, Infrared Equipment Association, Annual Meeting, Santa Fe, NM, November 1998.
2. Photodegradation and Stabilization of Polymers, U.S. Air Force Collective Pollution Prevention Conference, James W. Rawlins, San Antonio, TX, August 1998.
3. Photodegradation and Stabilization of Polymers, Coatings Science for Coatings Chemists Short Course, James W. Rawlins, Hattiesburg, MS, 1998.
4. Laboratory Section for Formulation, Stoichiometry, and Functional Group Indexing of Thermosetting Coatings; and Low VOC Technology in Coatings, Coatings Science for Coatings Formulators Short Course, James W. Rawlins, Hattiesburg, MS, June 1998.
5. Polymer Design for Powder Coatings; Powder Coatings Additives; Powder Coating Formulation; Powder Coatings Surface Pretreatment; and Instrumental Analysis of Powder Coatings, Introduction to Powder Coatings Short Course, James W. Rawlins, Hattiesburg, MS, 1998.
6. Principles of Polymer Science: Formulation Principles; Surface Pretreatment Techniques; and Powder Coatings, Introduction to Coatings Science Short Course, James W. Rawlins, Hattiesburg, MS, 1998.
7. Photodegradation and Stabilization of Polymers, Modern Coatings Technology Short Course, James W. Rawlins, New Orleans, LA, 1998.

1997

1. Powder Coatings; and Surface Pretreatment, Introduction to Coatings Science Short Course, James W. Rawlins, Hattiesburg, MS, 1997.
2. Photodegradation and Stabilization of Polymers, Modern Coatings Technology Short Course, James W. Rawlins, New Orleans, LA, 1997.

3. Low Temperature Ultraviolet Curable Powder Coatings, PCI Powder Coating, Formulation, and Production Conference, James W. Rawlins and Shelby F. Thames, Indianapolis, IN, 1997.

1996

1. Powder Coatings; and Surface Pretreatment, Introduction to Coatings Science Short Course, James W. Rawlins, Hattiesburg, MS, 1996.
2. Powder Coatings, ACS Coatings Short Course, James W. Rawlins, New Orleans, LA, March 1996.

1995

1. Advances in Powder Coatings, Introduction to Powder Coatings Technology Short Course, James W. Rawlins, Hattiesburg, MS, 1995.
2. Surface Pretreatment; and Paint Application Techniques, Introduction to Coatings Science Short Course, James W. Rawlins, Hattiesburg, MS, 1995.

SERVICE

ACADEMICS/COURSES TAUGHT AT SOUTHERN MISS

1. 2009 PSC 470/570 and PSC 470L/570L Surface Coatings, 4/1 cr hr lecture/lab. Fall 2009.
2. 2009 PSC 475 Biopolymers - Biomaterials, 2 cr hr lecture. Spring 2009.
3. 2008 PSC 470/570 and PSC 470L/570L Surface Coatings, 4/1 cr hr lecture/lab. Fall 2008
4. 2008 PSC 475 Biopolymers - Biomaterials, 2 cr hr lecture. Spring 2008.
5. 2007 PSC 470/570 and PSC 470L/570L Surface Coatings, 4/1 cr hr lecture/lab. Fall 2007.
6. 2007 PSC 302 Organic Polymer Chemistry II, 3 cr hr lecture, team taught with Dr. Charles McCormick. Spring 2007.
7. 2006 PSC 470/570 and PSC 470L/570L Surface Coatings, 4/1 cr hr lecture/lab. Fall 2006.
8. 2006 PSC703 Organic Polymer Chemistry III, 3 cr hr lecture. Spring 2006
9. 2005 PSC 470/570 and 470L/570L Surface Coatings, 4/1 cre hr lecture/lab. Fall 2005.
10. 2005 PSC 490 and FSC 490, Senior Research for Polymer and Forensic Science majors, 1 credit hr. Spring 2005.
11. 2004 PSC 470/570 and PSC 470L/570L Surface Coatings, 4/1 cr hr lecture/lab. Fall 2004.

GRADUATE THESES DIRECTED

STUDENT	YEAR JOINED	YEAR & DEGREE EARNED	THESIS/DISSERTATION/PROJECT	POST-GRADUATION
Stephen Foster	2009		Corrosion Matrixes	
Christine Caroselli	2008		Composite Matrix Materials	
Joshua Hanna	2008		Corrosion Control via Functional Films	
Stephanie Messer	2008		Corrosion Control Coatings Property Changes	
Achord, Brandon	2006		Block Copolymers Photovoltaic Materials	
Cipi, Pirro	2006		Enzyme Catalyzed Molecular Healing in	

			Polymeric Films	
Whittemore, James	2006		Excluded Volume Polymer Particles for Functional Films	
Swanson, Jeremy	2005		Matrix Material Connectivity Characterization before and after Degradation	
Sekiguchi, Shunji	2005	2007 M.S.	Study of Vegetable Oil Macromonomer Emulsions in Energy Absorbing Coatings	Industry: Nippon Paper Chemicals
Black, Micah	2004	2007 Ph.D.	Reactivity of Vegetable Oil Macromonomer Cis-unsaturation in Thiol-ene, Cationic, and Emulsion Polymerizations	Industry: Clorox
Johnson, Ericka (managed for Thames)	2004	2007 M.S.	Biobased Resins for Wrinkle Resistant Textiles and Determination of Structure-Property Relationships	Ph.D. program: Georgia Institute of Technology
Shera, Jeanne (managed for Thames)	2004	2007 Ph.D.	Soy Protein Isolate Molecular Level Contributions to Bulk Adhesive Properties	Postdoc: Kansas State University
Quintero, Carolina (managed for Thames)	2004	2004 Ph.D.	Vegetable Oil Macromonomer Kinetics and Loci During Emulsion Polymerization	Industry: Andercol

GRADUATE COMMITTEES SERVED

STUDENT	YEAR JOINED	YEAR & DEGREE EARNED	THESIS/DISSERTATION/PROJECT	POST-GRADUATION
Frank, Katherine	2008		A Study of Bulky Pendant Groups and Compression Yield in Glassy Polymer Networks	Wiggins
Hartlage, Todd	2008		Measurement and Application of Run Number in the Polymerization Kinetics of Reversibly Activated Cationic Systems	Storey
Gorman, Irene	2008		A Novel Room Temperature-Cure Polytriazole Resin with Delayed Cu(I) Catalyzation	Storey

Heinz, Stephen	2008		Study on the Effects of Glassy Network Chemistry on Polymer Composite Yield and Fracture Properties	Wiggins
Sharp, Melanie	2008			Lochhead
Kwisnek, Luke	2008		Photopolymerized Membranes for Gas Separation	Nazarenko
Aumsuwan, Nattharika (Meagan)	2008		Microwave Plasma Functionalized Polymeric Surfaces	Urban
Sahagun, Christopher	2008		Nanoscale Properties of the Interphase of Carbon Fiber Reinforced Plastic Surfaces and Epoxy Adhesives	Morgan
Harris, Christopher Andrew	2007		Investigation of the Synthesis and Film Formation Behavior of Novel Glycopolyelectrolytes Produced via Reversible Addition Fragmentation Chain Transfer Polymerization	Morgan
Kaushik, Mukul	2007		Responsive Networks Based on Hyperbranched Aliphatic Esters Cross-linked with Diisocyanates	Nazarenko
Tas, Huseyin	2005		Synergy in Cyclopolymerization of New Acrylate-Based Functional Monomers	Mathias
Tas, Eylem	2005		Biodegradable Polymers and Nanocomposites for Single-Use Disposable Plastics	Mathias
Novitsky, Ted	2005		Polyurethane/Clay Nanocomposite Foams	Mathias
Alidedeoglu, Husnu "Alp"	2005		Investigation of Nanotribological Properties of Hyaluronic Acid and Its Derivatives Prepared via Surface Initiated Polymerization	Morgan
Kaya, Ethem	2005		Effect of Amino Acid Side Chain Structure on Polymerization and Secondary Structure of Poly(Amino Acid)	Mathias
Misra, Rahul	2005		Investigation of Surface Morphology and Properties of Polyhedral Oligomeric Silsesquioxane (POSS®) Hybrid Polymeric Nanocomposites	Morgan
Lange, Chris	2005	2009	Spectroscopic Investigation of	Mathias

			Polyamide End Groups and Reactivity	
Moore, Mary Rogers	2005	2007 M.S.	Magnetic Nanocomposites and Electromagnetic Energy-Absorptive Blends Based on Unneutralized Ethylene Methacrylic Acid Copolymers	Tuskegee Univ. Ph.D. program Mauritz
Morizur, Jean Francois	2003	2008 Ph.D.	Synthesis and Characterization of Polymeric Materials Derived from Multifunctional Alkyl alpha-hydroxymethylacrylates	General Electric Mathias
Blackwell, Catherine "Cassie" Canady	1999	2004 Ph.D.	Evaluation of Vegetable Oil Based Macromonomers in Emulsion Polymerization	Bausch & Lomb, NY
Shier, Emery Harper	1998	2006 M.S.	Aromatic Sulfonyl Azides as Free-Radical Photoinitiators	Amarillo College, Instructor

POSTDOCTORAL FELLOWS/OTHER PH.D. RESEARCHERS DIRECTED

Kaya, Ethem	2009-current	
Cook, Richard	2009-2010	
Pathak, Shashi	2008-current	
Chen, Zhuoyuan	2008-current	
Williams, Eric	2008-current	
Pramanik, Monoj	2005-current	
Turel, Taci	2008-2009	Faculty position, Youngstown State University, Youngstown, OH
Zou, Mingxuan	2008	Returned to China
Yang, Huaxiang	2005-08	Crosslink USA, Fenton MO
Hao, Guangjie "Peter"	2005-08	Returned to Canada
Mann, Noel	2005-07	Southern Miss, Department of Chemistry
Liu, Yuan	2006-07	Franklin International, Columbus, OH
Tregre, Gregory	2005-06	Opened own business
Yu, Zhang Qing "Roy"	2004-06	Industry, Pennsylvania
Lei, Cuiyue "Cindy"	2004-05	University of Notre Dame, Notre Dame, IN
Kolekar, Suresh	2005	Returned to India
Dutta, Sandipan	2004-05	Franklin International, Columbus, OH
Chen, Yong Jun "Denny"	2004-05	Industry, California
He, Shangjin	2004	

UNDERGRADUATE RESEARCH DIRECTED

Jones, Andrew	2009

Thompson, Elanna	2009
McKinley, Reagan	2009
Persaud, Adam	2008
Munger, John	2008
Fowler, Eric	2008
Britt, Darren	2008
Libby, Kyle	2008
Ewing, Henry	2007
Gillis, Matthew	2006-current
Dickens, Emily	2005-current
Scott, Jonathan	2007-08
Abadie, Yvette	2005-08
White, Charles	2004-08
Cumberland, Joseph	2005-07
Budin, Christine	2005-06
Culpepper, Mary	2005-06
Hillenbrand, Scott	2004

SHORT COURSES

2008

1. Directed and sponsored Modern Coatings-Current and Emerging Technologies Short Course, New Orleans, LA, January 2008. Lectures: Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Material Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation Stabilization and Lifetime of Polymers.

2007

1. Directed and sponsored two on-campus short courses in 2007:
   a. Introduction to Coatings Science, Hattiesburg, MS, March 2007. Lectures: Introduction to Polymer Science; Chemistry of Coatings; New Technology Review; and Pretreatment.
   b. Coatings Science for Coatings Chemist, Hattiesburg, MS, March 2007. Lectures: Introduction to Polymer Science; Polymer Synthesis and Design; Silicones and Fluoropolymers; Waterborne Technology Review; Biorefinery Coatings; The Size of Things; A Nanoscale Perspective of Thin Films; Emerging Trends; and Service Life Prediction of Coatings.
2. Directed and sponsored Modern Coatings – Current and Emerging Technologies Short Course, New Orleans, LA, February 2007. Lectures: Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Material Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation Stabilization and Lifetime of Polymers.

2006

1. Directed and sponsored two on-campus short courses in 2006:
   a. Introduction to Coatings Science, May 2006. Lectures: Introduction to Polymer Science and Coatings; and New Technology Review.

b. Coatings Science for Coatings Chemists, May 2006. Lectures: Introduction to Polymer Science; Natural Products in Coatings; Technical Coatings; and In-Service Failure of Coatings.

2. Directed and Sponsored Modern Coatings - Current and Emerging Technologies Short Course, New Orleans, LA, February 20-21, 2006. Lectures: Polymers in Decorative, Protective, and Functional Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Material Science in Coatings - Incompatible Materials for Performance Enhancement; Building Polymers, Particles, and Surfaces for Specific Functions in Thin Films; and Degradation and Stabilization of Polymers.

2005

1. Directed and sponsored Modern Coatings - Adapting to the Future Short Course, New Orleans, LA, January 31-February 1, 2005. Lectures: Polymers in Coatings; The Size of Things: A Nanoscale Perspective of Thin Films; Current and Emerging Trends in Coatings Science; Formulating Industrial Coatings; Degradation and Stabilization of Polymers; and Material Science in Coatings.

PROFESSIONAL SERVICE MANUSCRIPT REVIEW

Reviewed 49 papers between Aug 2004 and July 2009 for

- Polymer, Elsevier Sciences, Ltd.
- Polymer International, SCI, Wiley.
- Journal of Applied Polymer Science, Wiley InterScience.

UNIVERSITY AND DEPARTMENTAL SERVICE

2009

1. Undergraduate Recruiter 2004-current
2. Polymer Science Association Faculty Member/Advisor 2005-current
3. Petal High School job shadowing, four groups for eight days, February 2008, Caroselli and Hanna
4. Petal High School Senior Science Fair, judge, May 2009, Petal High School, Petal, MS, Rawlins, Cook, Achord, and Cipi
5. REU student, Jonathan Pham, Summer 2009
6. Mentor of Senior Project for Alexandra Jarriel of Oak Grove High School, Hattiesburg, MS, Spring 2009, Southern Miss Campus, Rawlins

2008

1. Petal High School job shadowing, two groups for four days, February 2008, Achord and Whittemore
2. Petal High School Senior Science Fair, judge, March 2008, Petal High School, Petal, MS, Rawlins, Achord, Cipi, Swanson, and Mendon
3. Petal High School, judged speeches, May 2008, Petal High School, MS, Rawlins, Achord, Blanton, Cipi, Swanson, and Mendon
4. Petal High School Career Night, November 2008, Petal High School, Petal, MS, Rawlins, Achord, Caroselli

2007

- Faculty Search Committee 2006-2007
- New CoST Mentoring Program for 2006-2007 for Andrew Fontenot and Brad Nicholson. University of Southern Mississippi Polymer Science, Rawlins
- Organic Faculty Search Committee meeting, Southern Miss Campus, Rawlins
- Mentor of Senior Project for Hank Ewing of Petal High School. Project: The production of biodiesel from recycled fats and oils obtained from restaurants. January 2007, Southern Miss Campus, Rawlins
- Library liaison for the department. A budget of $1500 to appropriate books relating to polymers for the library. Southern Miss Campus, Rawlins
- Polymer science presentation/demonstration to Petal Elementary Kindergarten Class, January 2007, Petal Elementary, Petal, MS, Blanton

2006

- Undergraduate Curriculum Committee 2005-2006
- Mississippi Mathematic & Science Career View, August 2006, Columbus, MS, Achord
- Mentor of Senior Project of Mitch McCowan of East Central High School. September 2006, Southern Miss Campus, Rawlins
- Coatings demonstration for Bayer Lectureship series for 100 high school students, September 2006, Southern Miss Campus, Rawlins and TRRG
- INSPIRE Undergraduate Conference, Judge for Oral and Poster Presentations, September 2006, Southern Miss Campus, Rawlins
- Honors Day Luncheon, October 2006, Southern Miss, Rawlins
- Black and Gold Day, 1500 high school students, Southern Miss, Rawlins
- Polymers and fibers presentation to 1st and 2nd graders, December 2006, River of Life School of Excellence, Johnson
- Recruiting at Georgia Tech, April 1, 2006, Atlanta, GA, Johnson
- 2006 Presidential Alumni Celebration, March–April 2006, Thames-Rawlins Research Group and Wicks Research Group, Rawlins, Witherby, Cascio, Steele, Delatte, Swanson, Ferguson, Stromeyer, Shera, Black and McNeese and Selph
- Departmental Web site: designed website based on University of Southern Mississippi standards January-June 2006, Southern Miss, Cascio
- Petal High School Senior Science Fair, judge, March 2006, Petal High School, Petal, MS, Rawlins
- Biomass Conference, chaired and presented, April 2006, Choctaw, MS, Rawlins
- Proctored a standardized testing, May 2006, Hattiesburg Middle School, Hattiesburg, MS, Swanson
- High School Senior Projects, judge, May 2006, Petal High School, Petal, MS, Rawlins
- Wayne County Middle School Field Trip for 8th graders, May 2006, Southern Miss Campus, Ferguson and Blanton
- Polymer Summer Science Camp 12-15 yr olds, worked with Mississippi Gulf Coast Community College, June-July 2006, Southern Miss, Rawlins, Blanton, Dickens
- Powder coatings demonstration and multiple lectures for Summer Program for Academically Talented Youth, July 2006, Southern Miss, Shera, Davis, Achord
- Summer REU Program, Rachel Parks, Southern Miss Campus, Stromeyer

- IGERT Web site-Designed logo and 8 page website, July-August 2006, Southern Miss Campus, Cascio

2005

- Moss Point High Dedication Ceremony for Polymer Science Technology Center, November 2005, Moss Point Polymer Department, Moss Point; MS, Thames, Rawlins
- Vancleave High School, General Chemistry Lectures, May 2005, Gulf Coast, MS, Rawlins
- Polymer science presentation/demonstration to Petal Elementary First Grade Class, May 2005, Petal Elementary, Petal, MS, Blanton
- Composites demonstration to visiting science teachers, May 2005, Southern Miss campus, Shera
- High school teachers at Southern Miss, May 2005, Southern Miss, Rawlins, Thames
- The Mississippi School of Mathematics & Science guest lecturer and recruiting, September 2005, Columbus, MS, Rawlins
- Honors Day, November 2005, Southern Miss, Moore, Moore
- Petal High School Career Night, November 2005, Petal High School, Petal, MS, Rawlins
- Prime Timers Group in Petal, November 2005, Macedonia Baptist Church, Petal, MS, Blanton
- Black & Gold Day, November 2005, Southern Miss campus, Rawlins
- Austin-Peay State University, November 2005, Clarksville, TN, Rawlins
- College Day West Jones High School, December 2005, Laurel, MS, Rawlins
- Transfer Day-Southern Miss Admissions December 2005, Southern Miss campus, Rawlins

2004

- The Mississippi School of Mathematics & Science; September 2004, Columbus, MS, Rawlins
- INSPIRE Conference for Undergraduates, October 2004, Southern Miss, Rawlins
- Honors Day, October 2004, Southern Miss Campus, Stromeyer, Achord.
- Southern Miss College & Career Expo, November 2004, Gulf Coast Coliseum, Johnson, Black
- Black & Gold Day, November 2004, Southern Miss Campus, Bayley, Bayley
- Jones County Junior College Career Day, November 2004, Jones County Junior College, Ellisville, MS,. Rawlins, Jacobs, Jacobs
- Mississippi Gulf Coast Community College, Guest Lecturer, November 2004, Perkinston Campus, Wiggins, MS, Rawlins
- Presentation on Polymer Science and Nanotechnology, September 2004, Mississippi Engineering Association Monthly Meeting, Hattiesburg, MS, Rawlins